

# Curriculum Vitae

1. Name Kiyoshi Kiyokawa
2. Gender Male
3. Date of Birth July 5, 1970
4. Current Appointment Professor, Graduate School of Information Science, Nara Institute of Science and Technology (NAIST)
5. Contact Address
  - a. Postal Address 8916-5, Takayama, Ikoma, Nara 630-0192, Japan
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6. Research Field Information Science
7. Research Interest  
Virtual Reality, Augmented Reality, Mixed Reality, 3D Display, 3D User Interface, Wearable Computing, Computer Supported Collaborative Work, Computer Vision
8. Educational Backgrounds (after high school)
  - Dropped out (grade-skipping), School of Engineering Science, Osaka University, 1994
  - M.Eng in Information Science, Nara Institute of Science and Technology, 1996
  - Ph.D in Information Science, Nara Institute of Science and Technology, 1998
9. Professional Backgrounds
  - Postdoctoral Fellow, Japan Society for the Promotion of Science, 1998
  - Researcher, Communications Research Laboratory (current National Institute of Information and Communications Technology), Ministry of Posts and Telecommunications, 1999
  - Visiting Scholar, Human Interface Technology Laboratory, University of Washington,

2001

- Associate Professor, Cybermedia Center, Osaka University, 2002-2017
- Professor, Graduate School of Information Science, Nara Institute of Science and Technology, 2017-

## 10. Biography

Dr. Kiyoshi Kiyokawa is recognized as one of the leading researchers in the field of virtual and augmented reality. He has served as general and program chairs at numerous prestigious academic conferences such as IEEE International Symposium on Mixed and Augmented Reality (ISMAR), IEEE Virtual Reality (VR), IEEE Symposium on 3D User Interfaces (3DUI), and ACM Virtual Reality Software and Technology (VRST). His major research achievements include inventions of transitional augmented reality (1998), occlusion-capable optical see-through head mounted displays (2000), super wide field-of-view optical see-through head mounted displays (2007), and corneal imaging for HMD calibration (2015).

He has received over 20 awards including the Best Paper of the Year of Computer & Graphics, Elsevier (2001) and the Outstanding Contribution Award from the Virtual Reality Society of Japan (2006). He has given over 50 keynote and invited talks including: The 10th Anniversary Festival of the Virtual Reality Society of Japan (2006), The 6th Japan-Germany Frontiers of Science Symposium (2009), The 11th Japan-America Frontiers of Engineering Symposium (2012), and The Kyoto Prize Commemorative Workshop (2012). He has co-authored twelve book chapters including Emerging Technologies of Augmented Reality, Ideas, Inc. (2006), the Handbook of Visual Display Technology, Springer (2011), and Fundamentals of Wearable Computers and Augmented Reality, CRC Press (2014) as well as over 50 journal papers and over 300 conference and review papers. He is an emeritus member of the Steering Committee of International Symposium on Mixed and Augmented Reality (ISMAR) and Chair of the Special Interest Group of Mixed Reality (SIG-MR) of the Virtual Reality Society of Japan.

He received his Ph.D. degree in information systems from the Nara Institute of Science and Technology in 1998. He worked for the National Institute of Information and Communications Technology from 1999 to 2002. He was a visiting researcher at the Human Interface Technology Laboratory of the University of Washington from 2001 to 2002. He was an associate professor at the Cybermedia Center, Osaka University from 2002 to 2017. He

is a full professor at Graduate School of Information Science, Nara Institute of Science and Technology from 2017.

#### 11. Awards

Selected Award (among 24)

- Best Paper Award, Augmented Human Conference 2016.
- Best Paper Award, ACM International Conference on Intelligent User Interfaces (IUI), 2013
- Best Paper Award, International Conference on Artificial Reality and Telexistence (ICAT), 2011
- Best Short Paper Award, ACM Virtual Reality Software and Technology (VRST), 2009
- Outstanding Contribution Award, The Virtual Reality Society of Japan, 2006
- Best Paper Award, IEEE SAINT 2004
- Best Paper of the Year, Computer & Graphics, Elsevier, 2002
- Young Researcher's Award, The Virtual Reality Society of Japan, 2001
- TELECOM System Technology Award for Students, The Telecommunications Advancement Foundation, 1998
- Young Researcher's Award, The Institute of Electronics, Information and Communication Engineers (IEICE), 1997
- Best Paper Award for Young Researcher, Information Processing Society of Japan, 1997
- Best Presentation Award, 11th Human Interface Symposium, 1995

#### 12. List of Publications

Full list can be found at

<http://www.lab.ime.cmc.osaka-u.ac.jp/~kiyo/pukiwiki/index.php?Publications>

Selected Book Chapters (among 12)

- Kiyoshi Kiyokawa: "Head Mounted Display Technologies for Augmented Reality," in "Fundamentals of Wearable Computers and Augmented Reality, 2nd edition," (Ed. Barfield et al.), 2014.
- Kiyoshi Kiyokawa: "Occlusion Displays," in Handbook of Visual Display Technology, Springer, 2010.
- Kiyoshi Kiyokawa: "An Introduction to Head Mounted Displays for Augmented Reality," in "Emerging Technologies of Augmented Reality" (Ed. Haller, Thomas and Billingham), Ch. III, Dec. 2006.

- Kiyoshi Kiyokawa: "Human Communication in Collaborative Augmented Reality Systems," in Emerging Technologies of Augmented Reality (Ed. Haller, Thomas and Billinghamurst), Ch. XII, Dec. 2006.

#### Selected Invited Talks (among 58)

- "A Wide Field of View Head Mounted Display and Its Effects on Search Performance in Augmented Reality," Society for Information Display's Display Week (SID) 2016, San Francisco, USA, May, 2016.
- "Research Challenges in Head Mounted Displays – From Augmented Reality to Remapped Reality –", CDL Workshop on Tracking Technology for AR, "Taking AR to the Next Level", Graz, Austria, 2014.
- "Trends and Visions of Head Mounted Display Technologies", The Winter Augmented Reality Meeting (WARM) 2014, Keynote, 2014.
- "Designing, Implementing and Evaluating Wide-view Optical See-through Head Mounted Displays", Qualcomm Augmented Reality Lecture Series in Vienna, 2014.
- Invited Panelist at Kyoto Prize, The 2012 Kyoto Prize Workshop, 2012.
- "Video Content Analysis for Augmented and Mixed Reality", 11th Japan-America Frontiers of Engineering Symposium, 2012.
- "Trends and Vision of Head Mounted Displays for Augmented Reality," International Symposium on Ubiquitous Virtual Reality (ISUVR) 2012, 2012.
- "Display Technology for AR", International Display Workshop (IDW) 2011, 2011.
- "An Introduction to Virtual Reality", 6th Japan-Germany Frontiers of Science Symposium, 2009.
- "Trends and Visions of Augmented Reality Display Technologies", Nikkei BP FPD International 2009 Forum, 2009.
- "3D Collaboration using Mixed Reality Technology", 1st International Symposium on Universal Communication, 2007.

#### Selected Journal Papers (among 51)

- Jason Orlosky, Kiyoshi Kiyokawa, and Haruo Takemura, "Virtual and Augmented Reality on the 5G Highway", Journal of Information Processing, Special Issue on "Network and Distributed Processing", Feb. 2017 (Invited Paper).
- Jason Orlosky, Takumi Toyama, Kiyoshi Kiyokawa, and Daniel Sonntag, "ModuLAR: Eye-controlled Vision Augmentations for Head Mounted Displays," IEEE Transactions on Visualization and Computer Graphics (TVCG), Special Issue on International

Symposium on Mixed and Augmented Reality (ISMAR) 2015, Vol. 21, No. 11, pp. 1259-1268, 2015.

- Alexandor Plopski, Yuta Itoh, Christian Nitschke, Kiyoshi Kiyokawa, Gudrun Klinker, and Haruo Takemura, "Corneal-Imaging Calibration for Optical See-Through Head-Mounted Displays," IEEE Transaction on Visualization and Computer Graphics (TVCG), Vol. 21, No. 4, pp. 481-490, 2015.
- Jason Orlosky, Kiyoshi Kiyokawa and Haruo Takemura: "Managing Mobile Text in Head Mounted Displays: Studies on Visual Preference and Text Placement," Mobile Computing and Communications Review, Vol. 18, No. 2, pp. 20-31, 2014.
- Mayu Iwata, Hiroki Miyamoto, Takahiro Hara, Daijiro Komaki, Kentaro Shimatani, Tomohiro Mashita, Kiyoshi Kiyokawa, Toshiaki Uemukai, Gen Hattori, Shojiro Nishio, and Haruo Takemura: "A Content Search System Considering the Activity and Context of a Mobile User," International Journal of Personal and Ubiquitous Computing, June 2012.
- Hiroki Mori, Erika Sumiya, Tomohiro Mashita, Kiyoshi Kiyokawa, and Haruo Takemura: "A Wide-view Parallax-free Eye-mark Recorder with a Hyperboloidal Half-silvered Mirror and Appearance-based Gaze Estimation", IEEE Transaction on Visualization and Computer Graphics, IEEE Computer Society Digital Library, <<http://doi.ieeecomputersociety.org/10.1109/TVCG.2010.113>>, Nov. 2010.
- Doug Bowman, Sabine Coquillart, Bernd Froehlich, Michitaka Hirose, Yoshifumi Kitamura, Kiyoshi Kiyokawa and Wolfgang Stuerzlinger: "3D User Interfaces: New Directions and Perspectives," IEEE Computer Graphics and Applications, Vol. 28, No. 6, pp. 20-36, Nov. 2008.
- M. Billinghurst, D. Belcher, A. Gupta, K. Kiyokawa: "Communication Behaviors in Co-located Collaborative AR Interfaces", International Journal of Human Computer Interaction (IJHCI), Vol.16, No.3, pp.395-423, 2002.
- M. Billinghurst, H. Kato, K. Kiyokawa, D. Belcher, I. Poupyrev: "Experiments with Face-to-face Collaborative AR Interfaces", Virtual Reality Journal, Vol.6, No.3, pp.107-121, Oct. 2002.
- Kiyoshi Kiyokawa, Yoshinori Kurata, Hiroyuki Ohno: "An Optical See-through Display for Mutual Occlusion with a Real-time Stereo Vision System", Elsevier Computer & Graphics, Special Issue on "Mixed Realities - Beyond Conventions", Vol.25, No.5, pp.765-779, 2001.
- Kiyoshi Kiyokawa, Haruo Takemura, Naokazu Yokoya: "SeamlessDesign for 3D Object Creation," IEEE MultiMedia Magazine, ICMCS '99 Special Issue, Vol.7, No.1, pp.22-33, 2000.

Selected Conference Papers (among over 200)

- Alexander Plopski, Yuta Itoh, Jason Orlosky, Christian Nitschke, Kiyoshi Kiyokawa, Gudrun Klinker, "Automated Spatial Calibration of HMD Systems with Unconstrained Eye-cameras," Proc. of the IEEE International Symposium on Mixed and Augmented Reality (ISMAR) 2016, Sep., 2016.
- Yuki Yano, Kiyoshi Kiyokawa, Andrei Sherstyuk, Tomohiro Mashita, and Haruo Takemura, "Investigation of Dynamic View Expansion for Head-Mounted Displays with Head Tracking in Virtual Environments," Proc. of the 24rd International Conference on Artificial Reality and Telexistence (ICAT 2014), Dec. 2014.
- Jason Orlosky, Qifan Wu, Kiyoshi Kiyokawa, Christian Nitschke, and Haruo Takemura, "Fisheye Vision: Peripheral Spatial Compression for Improved Field of View in Head Mounted Displays," Proc. of the 2nd ACM Symposium on Spatial User Interaction (SUI) 2014, Oct., 2014.
- Naohiro Kishishita, Kiyoshi Kiyokawa, Ernst Kruijff, Jason Orlosky, Tomohiro Mashita and Haruo Takemura, "Analysing the Effects of a Wide Field of View Augmented Reality Display on Search Performance in Divided Attention Tasks," Proc. of the International Symposium on Mixed and Augmented Reality (ISMAR) 2014, Sep., 2014.
- Takumi Toyama, Jason Orlosky, Daniel Sonntag and Kiyoshi Kiyokawa, "A natural interface for multi-focal plane head mounted displays using 3D gaze," Proc. of the 12th International Conference on Advanced Visual Interfaces (AVI) 2014, pp. 25-32, May, 2014.
- Bui Minh Khuong, Kiyoshi Kiyokawa, Andrew Miller, Joseph J. LaViola Jr., Tomohiro Mashita, and Haruo Takemura, "The Effectiveness of an AR-based Context-Aware Assembly Support System in Object Assembly," Proc. of the IEEE Virtual Reality 2014, Mar., 2014.
- Jason Orlosky, Kiyoshi Kiyokawa and Haruo Takemura, "Dynamic Text Management for See-through Wearable and Heads-up Display Systems," Proc. ACM Int. Conf. on Intelligent User Interfaces (IUI 2013), Mar. 2013.
- Naohiro Kishishita, Jason Orlosky, Tomohiro Mashita, Kiyoshi Kiyokawa and Haruo Takemura, "Investigation on the Peripheral Visual Field for Information Display with Real and Virtual Wide Field-of-view See-through HMDs," Proc. the 8th IEEE Symposium on 3D User Interfaces (3DUI 2013), Mar. 2013. (Poster)
- Duc Nguyen Van, Tomohiro Mashita, Kiyoshi Kiyokawa and Haruo Takemura, "Subjective Evaluations on Perceptual Depth of Stereo Image and Effective Field of View of a Wide-View Head Mounted Projective Display with a Semi-Transparent

Retro-Reflective Screen," Proc. IEEE Int. Symp. on Mixed Augmented Reality (ISMAR), Nov. 2012. (Poster)

- Takayuki Ohnishi, Kiyoshi Kiyokawa and Haruo Takemura, "Virtual Interaction Surface: Decoupling of Interaction and View Dimensions for Flexible Indirect 3D Interaction," Proc. the 7th IEEE Symposium on 3D User Interfaces (3DUI 2012), Mar. 2012.
- Duc Nguyen Van, Tomohiro Mashita, Kiyoshi Kiyokawa and Haruo Takemura, "Subjective Image Quality Assessment of a Wide-view Head Mounted Projective Display with a Semi-transparent Retro-reflective Screen," Proc. the 21st International Conference on Artificial Reality and Telexistence (ICAT 2011), Nov. 2011.
- Erika Sumiya, Tomohiro Mashita, Kiyoshi Kiyokawa and Haruo Takemura: "A Wide-view Parallax-free Eye-mark Recorder with a Hyperboloidal Half-silvered Mirror," Proc. ACM Symp. on Virtual Reality Software and Technology (VRST), pp. 19-22, Nov. 2009.
- Daniel Kurz, Kiyoshi Kiyokawa and Haruo Takemura: "Mutual Occlusions on Table-top Displays in Mixed Reality Applications," Proc. ACM Symp. on Virtual Reality Software and Technology (VRST), pp. 227-230, Oct. 2008.
- Kiyoshi Kiyokawa: "A Wide Field-of-view Head Mounted Projective Display using Hyperbolic Half-silvered Mirrors," Proc. IEEE and ACM Int. Symp. on Mixed Augmented Reality (ISMAR), pp. 207-210, Nov. 2007.
- Keiji Nagatani, Kazuya Yoshida, Kiyoshi Kiyokawa, Yasushi Yagi, Tadashi Adachi, Hiroaki Saitoh, Toshiya Suzuki and Osamu Takizawa: "Development of a Networked Robotic System for Disaster Mitigation -System Description of Multi-robot System and Report of Performance Tests-," The 6th International Conference on Field and Service Robotics (FSR), pp. 333-342, Jul. 2007.
- Kensaku Saitoh, Takashi Machida, Kiyoshi Kiyokawa and Haruo Takemura: "A 2D-3D Integrated Interface for Mobile Robot Control Using Omnidirectional Images and 3D Geometric Models," Proc. IEEE and ACM Int. Symp. on Mixed Augmented Reality (ISMAR), pp. 173-176, Oct. 2006.
- Kouichi Hirose, Takefumi Ogawa, Kiyoshi Kiyokawa and Haruo Takemura: "Interactive Reconfiguration Techniques of Reference Frame Hierarchy in the Multi-viewport Interface," Proc. IEEE Symp. on 3D User Interfaces (3DUI), pp. 75-82, Mar. 2006.
- Masaki Maeda, Takefumi Ogawa, Kiyoshi Kiyokawa and Haruo Takemura: "Tracking of User Position and Orientation by Stereo Measurement of Infrared Markers and Orientation Sensing," Proc. IEEE Int. Symp. on Wearable Computers (ISWC), pp. 77-84, Nov. 2004.
- Kiyoshi Kiyokawa, Mark Billinghurst, Bruce Campbell and Eric Woods: "An

Occlusion-Capable Optical See-through Head Mount Display for Supporting Co-located Collaboration," Proc. IEEE and ACM Int. Symp. on Mixed Augmented Reality (ISMAR), Oct. 2003.

- K. Kiyokawa, M. Billinghurst, S. E. Hayes, A. Gupta, Y. Sannohe, and H. Kato: "Communications Behaviors of Co-located Users in Collaborative AR Interfaces," Proceedings of the IEEE and ACM International Symposium on Mixed and Augmented Reality 2002 (ISMAR 2002), 2002.
- Kiyoshi Kiyokawa, Yoshinori Kurata, Hiroyuki Ohno: "An Optical See-through Display for Mutual Occlusion of Real and Virtual Environments", Proceedings of the IEEE and ACM International Symposium on Augmented Reality 2000 (ISAR 2000), pp.60-67, 2000.

### 13. List of Academic Services

Selected services

- Board member of the Virtual Reality Society of Japan, 2011-
- Councilor of Human Interface Society, Japan, 2012-
- General Co-Chair, IEEE Symposium on 3D User Interfaces (3DUI) 2008-2010
- General Co-Chair, International Conference on Artificial Reality and Telexistence (ICAT) and Eurographics Symposium on Virtual Environments (EGVE) 2014, 2015, 2016
- General Chair, IEEE Virtual Reality (VR) 2019 (appointed), 2019
- Program Co-Chair, IEEE International Symposium on Mixed and Augmented Reality (ISMAR) 2012, 2013
- Program Co-Chair, IEEE Virtual Reality (VR) 2012, 2014
- Program Co-Chair, Joint Virtual Reality Conference (JVRC) 2012
- Program Co-Chair, International Conference on Artificial Reality and Telexistence (ICAT) 2011
- Program Co-Chair, ACM Virtual Reality Software and Technology (VRST) 2009